WHAT IS CLAIMED IS

1. A diffraction grating used in an optical head device leading light from a light source to an optical system, converging the light on an optical recording medium through a converging lens, detecting reflected light from the optical recording medium by a photodetector and recording information to the optical recording medium, reproducing information therefrom, or performing both the recording and reproducing, said diffraction grating comprising a grating part which comprises a plurality of divided areas,

wherein:

a setting is made such that diffracted light exiting from each of the plurality of areas is led to a corresponding particular photo-detecting area of the photodetector; and

each of the plurality of areas of the diffraction grating is produced either by first two-beam interference exposure in which a hologram recording material is exposed to interference fringes produced from first divergent light emitted from a position

equivalent to a light emitting point on the light source of the optical head device and second divergent light emitted from a position equivalent to a light receiving point corresponding to each photo-detecting area on the photodetector, or by second two-beam interference exposure in which a hologram recording material is exposed to interference fringes produced from first convergent light converging at the position equivalent to the light emitting point on the light source of the optical head device and second convergent light converging at the point equivalent to the light receiving point corresponding to each photo-detecting area.

2. A method for producing the diffraction grating claimed in claim 1, comprising the step of:

performing exposure while disposing a sector mask defining the respective areas immediately before the hologram recording material, when producing the plurality of areas of the diffraction grating by the two-beam interference exposure individually,

3. The diffraction grating as claimed in claim 1, wherein:

a wavelength of the light used for producing the diffraction grating through the interference exposure is different from a wavelength of the optical head device; and

each of the plurality of areas of the diffraction grating is produced either by first two-beam interference exposure in which a hologram recording material is exposed to first divergent light emitted from a position corresponding to the light emitting point on the light source of the optical head device determined according to the difference in wavelength and second divergent light emitted form a position corresponding to the light receiving point of each photo-detecting area determined according to the difference in wavelength, or by second two-beam interference exposure in which a hologram recording material is exposed to first convergent light converging at the position corresponding to the light emitting point on the light source of the optical head device determined according to the difference in wavelength and second convergent light converging at the position corresponding to the light receiving point of each photo-detecting area determined according to the

difference in wavelength.

4. A method for producing the diffraction grating claimed in claim 3, comprising the step of:

configuring at least one optical system used for the two-beam interference exposure so that the optical system provides aberration for canceling out aberration otherwise occurring due to difference in wavelength of the light used between recording operation for the hologram recording material and reproduction operation in the optical head device so that diffracted light without aberration is obtained on the photodetector in a condition in which the thus-produced diffraction grating is applied in the optical head device.

5. The method for producing the diffraction grating as claimed in claim 4, further comprising the step of:

disposing a hologram providing the aberration canceling out the aberration otherwise occurring when difference occurs in wavelength between recording and reproduction in at least one optical path of the two-beam interference exposure optical systems.

6. A method for duplicating a diffraction grating, comprising the steps of:

utilizing the diffraction grating claimed in claim 1, comprising the grating part which is divided into the plurality of areas, as an original hologram plate, and making the original hologram plate and a hologram recording material for duplication approximately in contact with one another; and

applying light from the side of the original hologram plate, so as to expose the hologram recording material to interference fringes produced by 0-th light and 1-st diffracted light generated from the original hologram plate.

7. A method for duplicating a diffraction grating, comprising the steps of:

configuring a diffraction grating based on calculation made through a computer for interference fringes equivalent to that of said diffraction grating claimed in claim 1 which comprises the grating part divided into the plurality of areas, for utilizing it as an original hologram plate, and making the original hologram plate and a hologram recording material for duplication approximately in contact with one another; and

applying light from the side of the original hologram plate, so as to expose the hologram recording material to interference fringes produced by 0-th light and 1-st diffracted light generated from the original hologram plate.

8. The method for duplicating a diffraction grating as claimed in claim 6, wherein:

convergent light converging at the position equivalent to the emitting point on the light source of the optical head device or divergent light emitted from

the position equivalent to the light emitting point on the light source of the optical head device is used as light to be applied when the original hologram plate of the diffraction grating is made approximately in contact with the hologram recording material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated.

9. The method for duplicating a diffraction grating as claimed in claim 7, wherein:

convergent light converging at the position equivalent to the emitting point on the light source of the optical head device or divergent light emitted from the position equivalent to the light emitting point on the light source of the optical head device is used as light to be applied when the original hologram plate of the diffraction grating is made approximately in contact with the hologram recording material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated.

10. The method for duplicating a diffraction grating as claimed in claim 6, wherein:

convergent light converging at a position, corresponding to the light emitting point of the light source, determined according to a difference between the duplicating wavelength and the light source wavelength of the optical head device or divergent light emitted from a position, corresponding to the light emitting point of the light source, determined according to the difference between the duplicating wavelength and the light source wavelength of the optical head device is used as light to be applied when the original hologram plate of the diffraction grating is made approximately in contact with the hologram recording material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated,

11. The method for duplicating a diffraction grating as claimed in claim 7, wherein:

convergent light converging at a position, corresponding to the light emitting point of the light

source, determined according to a difference between the duplicating wavelength and the light source wavelength of the optical head device or divergent light emitted from a position, corresponding to the light emitting point of the light source, according to the difference between the duplicating wavelength and the light source wavelength of the optical head device is used as light to be applied when the original hologram plate of the diffraction grating is made approximately in contact with the hologram recording material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated,

12. The method for duplicating a diffraction grating as claimed in claim 6, wherein:

convergent light converging at a position equivalent to a point from among a plurality of light receiving points respectively corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device or divergent light emitted from a position equivalent to a point from among the

plurality of light receiving points respectively corresponding to the plurality of photo-detecting areas is used as light to be applied when the original hologram plate of the diffraction grating is made approximately in contact with the hologram recording material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated.

13. The method for duplicating a diffraction grating as claimed in claim 7, wherein:

convergent light converging at a position equivalent to a point from among a plurality of light receiving points respectively corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device or divergent light emitted from a position equivalent to a point from among the plurality of light receiving points respectively corresponding to the plurality of photo-detecting areas is used as light to be applied when the original hologram plate of the diffraction grating is made approximately in contact with the hologram recording

material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated.

14. The method for duplicating a diffraction grating as claimed in claim 6, wherein:

convergent light converging at a position, corresponding to a point from among a plurality of light receiving points respectively corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device, determined according to a difference between the duplicating wavelength and the light source wavelength of the optical head device, or divergent light emitted from a position, corresponding to a point from among the plurality of light receiving points respectively corresponding to the plurality of photo-detecting areas of the photodetector of the optical head device, determined according to the difference between the duplicating wavelength and the light source wavelength of the optical head device is used as light to be applied when the original hologram plate of the diffraction grating is made approximately

in contact with the hologram recording material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated.

15. The method for duplicating a diffraction grating as claimed in claim 7, wherein:

convergent light converging at a position, corresponding to a point from among a plurality of light receiving points respectively corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device, determined according to a difference between the duplicating wavelength and the light source wavelength of the optical head device, or divergent light emitted from a position, corresponding to a point from among the plurality of light receiving points respectively corresponding to the plurality of photo-detecting areas of the photodetector of the optical head device, determined according to the difference between the duplicating wavelength and the light source wavelength of the optical head device is used as light to be applied when the original hologram

plate of the diffraction grating is made approximately in contact with the hologram recording material for duplication and the light is applied from the side of the original hologram plate so that the diffraction grating is duplicated.

16. The method for duplicating a diffraction grating as claimed in claim 12, wherein:

as the light to be applied for the duplication, convergent light converging at or divergent light diverging from a position corresponding to a light receiving point of a photo-detecting area from among the plurality of photo-detecting areas provided for obtaining a focus error signal is used.

17. The method for duplicating a diffraction grating as claimed in claim 13, wherein:

as the light to be applied for the duplication, convergent light converging at or divergent light

diverging from a position corresponding to a light receiving point of a photo-detecting area from among the plurality of photo-detecting areas provided for obtaining a focus error signal is used.

18. The method for duplicating a diffraction grating as claimed in claim 14, wherein:

as the light to be applied for the duplication, convergent light converging at or divergent light diverging from a position corresponding to a light receiving point of a photo-detecting area from among the plurality of photo-detecting areas provided for obtaining a focus error signal is used.

19. The method for duplicating a diffraction grating as claimed in claim 15, wherein:

as the light to be applied for the duplication, convergent light converging at or divergent light diverging from a position corresponding to a light

receiving point of a photo-detecting area from among the plurality of photo-detecting areas provided for obtaining a focus error signal is used.

20. A method for duplicating the diffraction grating claimed in claim 1, comprising the steps of:

configuring a diffraction grating based on calculation made through a computer for interference fringes equivalent to that of the diffraction grating claimed in claim 1 which comprises the grating part divided into the plurality of areas, for utilizing it as a first original hologram plate, and making the original hologram plate and a hologram recording material for duplication approximately in contact with one another;

applying light from the side of the original hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the first original hologram plate so as to produced a second original hologram plate;

making the second original hologram plate and a hologram recording material for duplication

approximately in contact with one another; and

applying light from the side of the second original hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the first original hologram plate so as to produce a diffraction grating,

wherein, when the diffraction grating is produced as a result of the second original hologram plate being and the hologram recording material for duplication being made approximately in contact with one another and the light being applied from the side of the second original hologram plate, convergent light converging at a position equivalent to a light emitting point of the light source of the optical head device or divergent light emitted from the position equivalent to the light emitting point of the light source is used as the light to be applied.

21. A method for duplicating the diffraction grating claimed in claim 1, comprising the steps of:

configuring a diffraction grating based on

calculation made through a computer for interference fringes equivalent to that of the diffraction grating claimed in claim 1 which comprises the grating part divided into the plurality of areas, for utilizing it as a first original hologram plate, and making the first original hologram plate and a hologram recording material for duplication approximately in contact with one another;

applying light from the side of the first original hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the first original hologram plate so as to produce a second original hologram plate;

making the second original hologram plate and a hologram recording material for duplication approximately in contact with one another; and

applying light from the side of the second original hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the second original hologram plate so as to produce a diffraction grating,

wherein, in case where the duplicating exposure wavelength is different from the light source

wavelength, when the diffraction grating is produced as a result of the second original hologram plate and the hologram recording material for duplication being made approximately in contact with one another and the light being applied from the side of the second original hologram plate, convergent light converging at a position, corresponding to the light emitting point of the light source of the optical head device, determined according to a difference between the duplicating exposure wavelength and the light source wavelength of the optical head device, or divergent light emitted from a position, corresponding to the light emitting point of the light source of the optical head device, determined according to the difference between the duplicating exposure wavelength and the light source wavelength of the optical head device is used as the light to be applied.

22. A method for duplicating the diffraction grating claimed in claim 1, comprising the step of:

configuring a diffraction grating based on calculation made through a computer for interference

fringes equivalent to that of said diffraction grating claimed in claim 1 which comprises the grating part divided into the plurality of areas, for utilizing it as a first original hologram plate, and making the first original hologram plate and a hologram recording material for duplication approximately in contact with one another;

applying light from the side of the original hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the first original hologram plate so as to produce a second original hologram plate;

making the second original hologram plate and a hologram recording material for duplication approximately in contact with one another; and

applying light from the side of the second original hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the first original hologram plate so as to produce a diffraction grating,

wherein, when the diffraction grating is produced as a result of the second original hologram plate and the hologram recording material for

duplication being made approximately in contact with one another and the light being applied from the side of the second original hologram plate, convergent light converging at a position equivalent to a point from among a plurality of light receiving points corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device or divergent light emitted from a position equivalent to a point from among the plurality of light receiving points is used as the light to be applied.

23. A method for duplicating the diffraction grating claimed in claim 1, comprising the step of:

configuring a diffraction grating based on calculation made through a computer for interference fringes equivalent to that of said diffraction grating claimed in claim 1 which comprises the grating part divided into the plurality of areas, for utilizing it as a first original hologram plate, and making the original hologram plate and a hologram recording material for duplication approximately in contact with one another;

applying light from the side of the original

hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the first original hologram plate so as to produce a second original hologram plate;

making the second original hologram plate and a hologram recording material for duplication approximately in contact with one another; and

applying light from the side of the second original hologram plate, so as to expose the hologram recording material to the interference fringes produced by 0-th light and 1-st diffracted light generated from the second original hologram plate so as to produce a diffraction grating,

wherein, in case where the duplicating exposure wavelength is different from the light source wavelength of the optical head device, when the diffraction grating is produced as a result of the second original hologram plate and the hologram recording material for duplication being made approximately in contact with one another and the light being applied from the side of the second original hologram plate, convergent light converging at a position corresponding to a point from among a plurality of light receiving points corresponding to a plurality

of photo-detecting areas of the photodetector of the optical head device determined according to a difference between the duplicating exposure wavelength and the light source wavelength of the optical head device, or divergent light emitted from a position corresponding to a point from among the plurality of light receiving points corresponding to the plurality of photo-detecting areas of the photodetector of the optical head device according to the difference between the duplicating exposure wavelength and the light source wavelength of the optical head device is used as the light to be applied.

24. The method for duplicating a diffraction grating claimed in claim 6, wherein:

when the duplicating exposure wavelength is different from the light source wavelength of the optical head device, the duplicating exposure is performed with the use of an optical system for applying the light from the side of the original hologram plate configured so that said optical system provides aberration for canceling out aberration otherwise

occurring due to difference in light wavelength between the duplicating operation and the reproduction operation in the optical head device.

25. The method for duplicating a diffraction grating claimed in claim 7, wherein:

when the duplicating exposure wavelength is different from the light source wavelength of the optical head device, the duplicating exposure is performed with the use of an optical system for applying the light from the side of the original hologram plate configured so that said optical system provides aberration for canceling out aberration otherwise occurring due to difference in light wavelength between the duplicating operation and the reproduction operation in the optical head device.

26. A method for duplicating a diffraction grating comprising the step of:

using, as an original hologram plate, the diffraction grating according to claim 1 or a diffraction grating produced based on calculation made through a computer for interference fringes equivalent to said diffraction grating, and exposing a hologram recording material for duplication to interference fringes produced by diffracted 0-th light and 1-st diffracted light generated from the original hologram plate as a result of light being applied from the side of the original hologram plate to the hologram recording material for duplication via a relay optical system.

27. The method for duplicating a diffraction grating as claimed in claim 26, wherein:

the relay optical system is configured so that a surface on the original hologram plate and a surface on the hologram recording material for duplication have a relation of approximately conjugate planes in imaging.

28. The method for duplicating a diffraction grating as claimed in claim 26, wherein:

the relay optical system comprises two lens systems,

wherein a front-side focal point of a first lens system thereof closer to the original hologram plate coincides with a surface of the original hologram plate, a rear-side focal point of the first lens system is made coincident with a front-side focal point of a second lens system, and also, a rear-side focal point of the second lens system coincides with a surface of the hologram recording material for duplication.

29. The method for duplicating a diffraction grating as claimed in claim 26, wherein:

when a diffraction grating is duplicated as a result of light being applied from the side of the original hologram plate, a wavelength of the duplication applying light is in the vicinity of the light source wavelength of the optical head device, and, convergent light converging at a position equivalent to the light emitting point of the light source of the optical head

device or divergent light emitted from the position equivalent to the light emitting point of the light source is used as the light to be applied.

30. The method for duplicating a diffraction grating as claimed in claim 26, wherein:

when a diffraction grating is duplicated as a result of light being applied from the side of the original hologram plate, a wavelength of the duplication applying light is different from the light source wavelength of the optical head device, and, convergent light converging at a position corresponding to the light emitting point of the light source of the optical head device determined according to a difference between the duplicating wavelength and the light source wavelength of the optical head device, or divergent light emitted from the position, corresponding to the light emitting point determined according to the difference between the duplicating wavelength and the light source wavelength of the optical head device is used as the light to be applied.

31. The method for duplicating a diffraction grating as claimed in claim 26, wherein:

when a diffraction grating is duplicated as a result of light being applied from the side of the original hologram plate, a wavelength of the duplication applying light is in the vicinity of the light source wavelength of the optical head device, and, convergent light converging at a position equivalent to a point from among a plurality of light receiving points corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device or divergent light emitted from a position equivalent to a point from among the plurality of light receiving points is used as the light to be applied.

32. The method for duplicating a diffraction grating as claimed in claim 26, wherein:

when a diffraction grating is duplicated as a result of light being applied from the side of the original hologram plate, a wavelength of the duplication applying light is different from the light source wavelength of the optical head device, and, convergent

light converging at a position corresponding to a point from among a plurality of light receiving points corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device determined according to a difference between the duplicating wavelength and the light source wavelength of the optical head device, or divergent light emitted from a position corresponding to a point from among a plurality of light receiving points corresponding to a plurality of photo-detecting areas of the photodetector of the optical head device determined according to a difference between the duplicating wavelength and the light source wavelength of the optical head device is used as the light to be applied.

33. The method of duplicating a diffraction grating as claimed in claim 26, wherein:

a spatial filter is provided in the relay optical system for only transmitting 0-th light and a one of the 1-st diffracted light and blocking diffracted light in the other orders applied from the original hologram plate.

34. The method of duplicating a diffraction grating as claimed in claim 29, wherein:

a plane including a convergent point or a divergent point of the duplication applying light for the original hologram plate and perpendicular to an optical axis of the relay optical system and a plane including imaging points of light emitted from these points through the relay optical system and perpendicular to the axis have a relation of conjugate planes in imaging made by the relay optical system.

35. The method of duplicating a diffraction grating as claimed in claim 30, wherein:

a plane including a convergent point or a divergent point of the duplication applying light for the original hologram plate and perpendicular to an optical axis of the relay optical system and a plane including imaging points of light emitted from these points through the relay optical system and perpendicular to the axis have a relation of conjugate planes in imaging made by the relay optical system.

36. The method of duplicating a diffraction grating as claimed in claim 31, wherein:

a plane including a convergent point or a divergent point of the duplication applying light for the original hologram plate and perpendicular to an optical axis of the relay optical system and a plane including imaging points of light emitted from these points through the relay optical system and perpendicular to the axis have a relation of conjugate planes in imaging made by the relay optical system.

37. The method of duplicating a diffraction grating as claimed in claim 32, wherein:

a plane including a convergent point or a divergent point of the duplication applying light for the original hologram plate and perpendicular to an optical axis of the relay optical system and a plane including imaging points of light emitted from these points through the relay optical system and perpendicular to the axis have a relation of conjugate planes in imaging made by the relay optical system.

38. The method of duplicating a diffraction grating as claimed in claim 33, wherein:

a plane including a convergent point or a divergent point of the duplication applying light for the original hologram plate and perpendicular to an optical axis of the relay optical system and a plane including imaging points of light emitted from these points through the relay optical system and perpendicular to the axis have a relation of conjugate planes in imaging made by the relay optical system.

39. The method of duplicating a diffraction grating as claimed in 29, wherein:

an imaging magnification to the hologram recording material for duplication by the relay optical system from the original hologram plate surface is equal to an imaging magnification to the imaging point of light by the relay optical system from a converging point or a diverging point of the duplication applying light.

40. The method of duplicating a diffraction grating as claimed in 30, wherein:

an imaging magnification to the hologram recording material for duplication by the relay optical system from the original hologram plate surface is equal to an imaging magnification to the imaging point of light by the relay optical system from a converging point or a diverging point of the duplication applying light.

41. The method of duplicating a diffraction grating as claimed in 31, wherein: an imaging magnification to the hologram recording material for duplication by the relay optical system from the original hologram plate surface is equal to an imaging magnification to the imaging point of light by the relay optical system from a converging point or a diverging point of the duplication applying light.

42. The method of duplicating a diffraction grating as claimed in 32, wherein:

an imaging magnification to the hologram recording material for duplication by the relay optical system from the original hologram plate surface is equal to an imaging magnification to the imaging point of light by the relay optical system from a converging point or a diverging point of the duplication applying light.

43. The method of duplicating a diffraction grating as claimed in 33, wherein:

an imaging magnification for the hologram recording material for duplication by the relay optical system with respect to the original hologram plate surface is equal to an imaging magnification to the imaging point of light by the relay optical system from a converging point or a diverging point of the duplication applying light.

44. The method of duplicating a diffraction grating as claimed in claim 6, wherein:

the diffraction grating obtained through the duplication comprises a volume phase diffraction grating including liquid crystal material in the hologram recording material for duplication.

45. The method of duplicating a diffraction grating as claimed in claim 7, wherein:

the diffraction grating obtained through the duplication comprises a volume phase diffraction grating including liquid crystal material in the hologram recording material for duplication.

46. The method of duplicating a diffraction grating as claimed in claim 6, wherein:

the diffraction grating in the original hologram plate comprises a volume phase diffraction grating.

47. The method of duplicating a diffraction grating as claimed in claim 7, wherein:

the diffraction grating in the original hologram plate comprises a volume phase diffraction grating.

48. The method of duplicating a diffraction grating as claimed in claim 46, wherein:

the diffraction grating in the original hologram plate has a diffraction efficiency equal between for 0-th light and for +1-st diffracted light

49. The method of duplicating a diffraction grating as claimed in claim 47, wherein:

the diffraction grating in the original hologram plate has a diffraction efficiency equal between for 0-th light and for +1-st diffracted light

50. The method of duplicating a diffraction grating as claimed in claim 6, wherein:

the diffraction grating in the original hologram plate comprises a surface relief diffraction grating.

51. The method of duplicating a diffraction grating as claimed in claim 7, wherein:

the diffraction grating in the original hologram plate comprises a surface relief diffraction grating.

52. The method of duplicating a diffraction grating as claimed in claim 50, wherein:

the diffraction grating in the original hologram plate has a diffraction efficiency equal between for 0-th light and for +1-st diffracted light.

53. The method of duplicating a diffraction grating as claimed in claim 51, wherein:

the diffraction grating in the original hologram plate has a diffraction efficiency equal between for 0-th light and for +1-st diffracted light.

54. The method of duplicating a diffraction grating as claimed in claim 6, comprising the steps of:

making an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas approximately in contact with a hologram recording material for duplication, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from a diffraction grating of the original hologram plate as a result of light being applied from the side of the original hologram plate to the single diffraction grating;

moving relatively the original hologram plate, the hologram recording material for duplication and a light for the exposure after the exposure by a predetermined amount; and

repeating said step of exposure and said step of moving alternately a plurality of times.

55. The method of duplicating a diffraction grating as claimed in claim 7, comprising the steps of:

making an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas approximately in contact with a hologram recording material for duplication, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from a diffraction grating of the original hologram plate as a result of light being applied from the side of the original hologram plate to the single diffraction grating;

moving relatively the original hologram plate, the hologram recording material for duplication and a light for the exposure after the exposure by a predetermined amount; and

repeating said step of exposure and said step of moving alternately a plurality of times.

56. The method of duplicating a diffraction grating as claimed in claim 6, comprising the steps of:

making an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas approximately in contact with a hologram recording material for duplication, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from respective diffraction gratings of the original hologram plate as a result of light being applied from the side of the original hologram plate to the plurality diffraction gratings simultaneously from among the plurality of diffraction gratings included in the original hologram plate;

moving relatively the original hologram plate, the hologram recording material for duplication and a light for the exposure after the exposure by a predetermined amount; and

repeating said step of exposure and said step of moving alternately a plurality of times.

57. The method of duplicating a diffraction

grating as claimed in claim 7, comprising the steps of:

making an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas approximately in contact with a hologram recording material for duplication, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from respective diffraction gratings of the original hologram plate as a result of light being applied from the side of the original hologram plate to the plurality diffraction gratings simultaneously from among the plurality of diffraction gratings included in the original hologram plate;

moving relatively the original hologram plate, the hologram recording material for duplication and a light for the exposure after the exposure by a predetermined amount; and

repeating said step of exposure and said step of moving alternately a plurality of times.

58. The method of duplicating a diffraction grating as claimed in claim 6, comprising the steps of:

making an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas approximately in contact with a hologram recording material for duplication, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from the respective diffraction gratings of the original hologram plate as a result of light being applied from the side of the original hologram plate to the plurality diffraction gratings simultaneously so as to expose the hologram recording material for duplication for the plurality of diffraction gratins included in the original hologram plate in a lump.

58. The method of duplicating a diffraction grating as claimed in claim 7, comprising the steps of:

making an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas approximately in contact with a hologram recording material for duplication, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light

generated from the respective diffraction gratings of the original hologram plate as a result of light being applied from the side of the original hologram plate to the plurality diffraction gratings simultaneously so as to expose the hologram recording material for duplication for the plurality of diffraction gratins included in the original hologram plate in a lump.

60. The method of duplicating a diffraction grating as claimed in claim 26, comprising the steps of:

disposing an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas recorded therein and a hologram recording material for duplication with the relay optical system inserted therebetween, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from a diffraction grating of the original hologram plate as a result of light being applied from the side of the original hologram plate to the single diffraction grating thereof; and

moving relatively the original hologram plate,

the hologram recording material for duplication and a light for the exposure after the exposure by a predetermined amount; and

repeating said step of exposure and said step of moving alternately a plurality of times.

61. The method of duplicating a diffraction grating as claimed in claim 26, comprising the steps of:

disposing an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas recorded therein and a hologram recording material for duplication with the relay optical system inserted therebetween, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from respective diffraction gratings of the original hologram plate as a result of light being applied from the side of the original hologram plate to the plurality of diffraction gratings from among the plurality of diffraction gratings of the original hologram plate; and

moving relatively the original hologram plate, the hologram recording material for duplication and a

light for the exposure after the exposure by a predetermined amount; and

repeating said step of exposure and said step of moving alternately a plurality of times.

62. The method of duplicating a diffraction grating as claimed in claim 26, comprising the steps of:

disposing an original hologram plate having a plurality of the diffraction gratings each having the plurality of divided areas recorded therein and a hologram recording material for duplication with the relay optical system inserted therebetween, and exposing the hologram recording material to interference fringes made from 0-th light and 1-st diffracted light generated from the respective diffraction gratings of the original hologram plate as a result of light being applied from the side of the original hologram plate to the plurality of diffraction gratings thereof so as to expose the hologram recording material for duplication for the plurality of diffraction gratings included in the original hologram plate in a lump.

63. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 6 being performed.

64. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 7 being performed.

65. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 54 being performed.

66. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 55 being performed.

67. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 56 being performed.

68. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 57 being performed.

69. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 58 being performed.

70. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 59 being performed.

71. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 60 being performed.

72. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 61 being performed.

73. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 62 being performed.

74. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 63 being performed.

75. A diffraction grating produced as a result of the method of duplicating a diffraction grating claimed in claim 64 being performed.

76. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, the diffraction grating claimed in claim 1 and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating.

77. An optical head device leading light from

a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 6.

78. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating produced by the method of duplicating a diffraction grating claimed in claim 6 and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 7.

79. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium

is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 54.

80. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 55.

81. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 56.

82. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording,

reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 57.

83. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light

path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 58.

84. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of

duplicating a diffraction grating claimed in claim 59.

85. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 60.

86. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 61.

87. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording,

reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 62.

88. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light

path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 63.

89. An optical head device leading light from a light source to an optical system, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein:

in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of

duplicating a diffraction grating claimed in claim 64.

90. The optical head device as claimed in claim 76, wherein:

said light source, said photodetector and said diffraction grating are united.

91. The optical head device as claimed in claim 77, wherein:

said light source, said photodetector and said diffraction grating are united.

92. The optical head device as claimed in claim 78, wherein:

said light source, said photodetector and said diffraction grating are united.

93. The optical head device as claimed in claim 79, wherein:

said light source, said photodetector and said diffraction grating are united.

94. The optical head device as claimed in claim 80, wherein:

said light source, said photodetector and said diffraction grating are united.

95. The optical head device as claimed in claim 81, wherein:

said light source, said photodetector and said diffraction grating are united.

96. The optical head device as claimed in

claim 82, wherein:

said light source, said photodetector and said diffraction grating are united.

97. The optical head device as claimed in claim 83, wherein:

said light source, said photodetector and said diffraction grating are united.

98. The optical head device as claimed in claim 84, wherein:

said light source, said photodetector and said diffraction grating are united.

99. The optical head device as claimed in claim 85, wherein:

said light source, said photodetector and said diffraction grating are united.

100. The optical head device as claimed in claim 86, wherein:

said light source, said photodetector and said diffraction grating are united.

101. The optical head device as claimed in claim 87, wherein:

said light source, said photodetector and said diffraction grating are united.

102. The optical head device as claimed in claim 88, wherein:

said light source, said photodetector and said

diffraction grating are united.

103. The optical head device as claimed in claim 89, wherein:

said light source, said photodetector and said diffraction grating are united.

104. An optical head device leading light from a plurality of light sources to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, the diffraction grating claimed in claim 1 and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by

the common photodetector after being branched off by means of the diffraction grating.

105. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 6.

106. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 7.

107. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting

reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 54.

108. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 55.

109. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after

being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 56.

110. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of

duplicating a diffraction grating claimed in claim 57.

111 An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 58.

112. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 59.

113. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting

reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 60.

114. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 61.

115. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after

being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 62.

116. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of

duplicating a diffraction grating claimed in claim 63.

117. An optical head device leading light from a light source to an optical system through a common coupling lens, converging the light to a recording medium by a converging lens, detecting reflected light from the recording medium by a photodetector and thus performing recording, reproduction or both recording and reproduction of information to or from the recording medium,

wherein in said optical system, a diffraction grating and a 1/4 wavelength plate are provided on the light path, and the reflected light from the recording medium is received by the common photodetector after being branched off by means of the diffraction grating; and

said diffraction grating comprises a diffraction grating produced through the method of duplicating a diffraction grating claimed in claim 64.

118. The optical head device as claimed in claim 104, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

119. The optical head device as claimed in claim 105, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

120. The optical head device as claimed in claim 106, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

121. The optical head device as claimed in

claim 107, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

122. The optical head device as claimed in claim 108, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

123. The optical head device as claimed in claim 109, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

124. The optical head device as claimed in claim 110, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

125. The optical head device as claimed in claim 111, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

126. The optical head device as claimed in claim 112, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

127. The optical head device as claimed in claim 113, wherein:

said plurality of light sources, said

photodetector and said diffraction grating are united.

128. The optical head device as claimed in claim 114, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

129. The optical head device as claimed in claim 115, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

130. The optical head device as claimed in claim 116, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

131. The optical head device as claimed in claim 117, wherein:

said plurality of light sources, said photodetector and said diffraction grating are united.

132. An optical disk drive apparatus employing the optical head device claimed in claim 76 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

133. An optical disk drive apparatus employing the optical head device claimed in claim 77 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

134. An optical disk drive apparatus employing the optical head device claimed in claim 78 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

135. An optical disk drive apparatus employing the optical head device claimed in claim 79 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

136. An optical disk drive apparatus employing the optical head device claimed in claim 80 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

137. An optical disk drive apparatus employing the optical head device claimed in claim 81 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

138. An optical disk drive apparatus employing the optical head device claimed in claim 82 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

139. An optical disk drive apparatus employing the optical head device claimed in claim 83 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

140. An optical disk drive apparatus employing the optical head device claimed in claim 84 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

141. An optical disk drive apparatus employing the optical head device claimed in claim 85 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

142. An optical disk drive apparatus employing the optical head device claimed in claim 86 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

143. An optical disk drive apparatus employing the optical head device claimed in claim 87 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

144. An optical disk drive apparatus employing the optical head device claimed in claim 88 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

145. An optical disk drive apparatus employing the optical head device claimed in claim 89 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

146. An optical disk drive apparatus employing the optical head device claimed in claim 104 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

147. An optical disk drive apparatus employing the optical head device claimed in claim 105 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

148. An optical disk drive apparatus employing the optical head device claimed in claim 106 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

149. An optical disk drive apparatus employing the optical head device claimed in claim 107 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

150. An optical disk drive apparatus employing the optical head device claimed in claim 108 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

151. An optical disk drive apparatus employing the optical head device claimed in claim 109 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

152. An optical disk drive apparatus employing the optical head device claimed in claim 110 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

153. An optical disk drive apparatus employing the optical head device claimed in claim 111 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

154. An optical disk drive apparatus employing the optical head device claimed in claim 112 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

155. An optical disk drive apparatus employing the optical head device claimed in claim 113 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

156. An optical disk drive apparatus employing the optical head device claimed in claim 114 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

157. An optical disk drive apparatus employing the optical head device claimed in claim 115 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

158. An optical disk drive apparatus employing the optical head device claimed in claim 116 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.

159. An optical disk drive apparatus employing the optical head device claimed in claim 117 to perform recording, reproduction or both recording and reproduction of information to or from a recording medium.